

NEW LAND SHELLS FROM THE PHILIPPINE ISLANDS.

By PAUL BARTSCH,

Curator, Division of Marine Invertebrates, United States National Museum.

The United States National Museum has recently received a sending of land shells from Mr. Walter F. Webb, of Rochester, New York, for determination. This shipment proves to be the most remarkable consignment that has come to my attention, for, all but one, *Chloraea gmeliniana* Pfeiffer, of the eight forms represented, require naming, and the latter, I believe, has not been found since Cumming secured it at Bayombong.

The material was obtained from one of the Mr. Webb's collectors at Maquebenga (Makabenga), who writes: "I live in Maquebenga, one of the rancherias of the newly conquered wild people. My place is situated in this mountainous district about 30 miles from Dupax. If you were coming here you would walk over our muddy trail, coiled on the mountain sides, for about two days." This rancheria is located in the mountain range between the headwaters of the Cagayan and Magat Rivers, about 30 miles east of Dupax, in southern Nueva Vizcaya, Luzon. It is in the territory of the Ilongates, a tribe that has not encouraged foreign exploration or collecting, hence the many novelties.

The sending might be considered a sample box on account of the limited number of specimens it contained, but notwithstanding this, Mr. Webb, with characteristic generosity, has donated all the types, in most cases the only specimens received, to the United States National Museum.

The nearest relatives of the forms described below appear to be in the Mount Polis Range, which separates Nueva Vizcaya from the mountain Province in the north.

COCHLOSTYLA LIGNARIA AGUINALDOI, new subspecies.

Plate 18, fig. 4.

Shell broadly ovate, all the whorls inflated and rounded, marked by decidedly retractorily slanting lines of growth and very fine, rather closely spaced spiral lirations. Suture strongly constricted. Surface covered by a thick periostracum, which carries the color markings. The color of the shell gradually changes from buff of the

first turn to a dark brown, which is almost purplish-black on the last turn, while the periostracum is banded with dark zones of the same tint as the shell and light buff hydrophanous lines and bands, the width and spacing of which are shown by our photograph of the type. Aperture large; outer lip moderately reflected, marked by the spiral bands to the very edge on the outside, while within it is edged by a broad, almost black border, which changes to a purplish tinge where it joins the bluish, satiny luster that colors the rest of the interior; columella somewhat flexuose, very dark excepting at the insertion, which is white, the juncture of the white and dark areas being marked by a purple line; parietal wall covered by a moderately thick callus.

The type (Cat. No 218400, U.S.N.M.) comes from Makabenga. It has 5.9 whorls and measures—altitude, 74.8 mm.; greater diameter, 57.9 mm.; lesser diameter, 49 mm. Compared with the other known subspecies of *Cochlostyla lignaria*, the present form stands out markedly by the almost black coloration of the last whorl.

COCHLOSTYLA MACROSTOMA VIZCAYANA, new subspecies.

Plate 18, fig. 6.

Shell ovate, whorls well rounded, marked by decidedly, retractorily slanting lines of growth and numerous fine incised spiral lines. Entire surface of the shell covered by a very thin deciduous periostracum, which carries the light hydrophanous spiral color markings shown in our figure of the type. The darker bands and lines are simply ground color showing through the transparent areas of the periostracum. Periphery inflated, well rounded. Suture moderately constricted. Aperture large, slightly channeled anteriorly; outer lip moderately reflected, with a broad dark brown zone at the inner edge, which shades to purplish where it joins the satiny bluish color of the interior; columella short, twisted, colored like the inner edge of the lip, at its inner border shading to the bluish of the interior on the callus that is reflected over the base; parietal wall covered by a very thin, pale bluish callus.

The type (Cat. No. 218403, U.S.N.M.) comes from Makabenga. It has 6.4 whorls and measures—altitude, 60.9 mm.; greater diameter, 40.7; lesser diameter, 33.9. The present subspecies, like all the other dark-colored *Cochlostylas* in this region, is at once differentiated from all its nearest allies by its much darker coloration.

COCHLOSTYLA CARINATA LUNAI, new subspecies.

Plate 18, fig. 5.

Shell elongate conic, decidedly carinated at the periphery of the last turn. Whorls moderately rounded, marked by slender, retractive lines of growth and rather coarse incised spiral lines. In addition

to this sculpture a number of ill-defined and irregularly spaced spiral lirations are present, of which seven appear on the last whorl of the type, between the summit and the periphery. The ground color of the shell varies from livid brown on the early turns to horn color on the last. The surface is covered by a thin, deciduous periostracum, which carries the characteristic color pattern of irregular, hydrophane axial bands, alternated with darker bands of about the same width. The arrangement of these bands is well shown in our figure of the type. Periphery of the last turn strongly angulated. Base moderately long, well rounded, marked like the surface of the spire. Aperture irregularly semicircular, decidedly channeled anteriorly; outer lip moderately reflected, marked by a very dark brown, almost purplish-black border which pales to purplish where it joins the pale blue satiny color of the interior; columella slightly concave, somewhat twisted, almost vertical, its inner edge reflected as a callus over a small portion of the base. The color of this reflected portion agrees with the dark edging of the outer lip; parietal wall covered by a thin, dark colored callus, which allows the olive color of the base to shine through it.

The type (Cat. No. 218401, U.S.N.M.) comes from Makabenga. It has 7.5 whorls and measures—altitude, 73; greater diameter, 35.3 mm.; lesser diameter, 30 mm.

In determining the systematic status of the present subspecies, it has been necessary to revise the entire group of *Cochlostyla carinata*, which has brought forth a number of new forms which will be published shortly. Of all the old and new so far seen, *Cochlostyla carinata lunai* is the most broadly conic, the most strongly carinated, and has the darkest border at the aperture.

COCHLOSTYLA LUZONICA MAKABENGANA, new subspecies.

Plate 18, figs. 1-3.

Shell helicoid, whorls well rounded, marked by fine, decidedly retractively slanting incremental lines and very fine, irregularly spaced, incised spiral striations. Nepionic turns almost two and a half, flesh colored; succeeding whorls turning rapidly darker, the last blackish-brown. The surface of the post-nepionic turns is covered by a thin deciduous periostracum, which carries the characteristic axial and spiral markings shown in our figure of the type. Suture moderately impressed. Periphery of the last whorl well rounded. Aperture large, dark brown at the inner edge, paling to smoky bluish deep within; columella very oblique; it, as well as its callus, white; parietal wall covered by a rather thin, translucent callus.

The type (Cat. No. 218404, U.S.N.M.), and a paratype in Mr. Webb's collection, come from Makabenga. The type has five whorls

and measures—altitude, 29.1 mm.; greater diameter, 38.3 mm.; lesser diameter, 30.5 mm. Mr. Webb's specimen has five whorls and measures—altitude, 30.6 mm.; greater diameter, 35.5 mm.; lesser diameter, 29.2 mm. The present subspecies is distinguished from all the other forms of *Cochlostyla luzonica* by its extremely dark coloration.

COCHLOSTYLA DOMINGOI, new species.

Plate 20, figs. 1-3.

Shell subglobose, subdiaphanous, milk white, excepting the base at the insertion of the columella, which is tinged with pale olive-green, the edge of the columellar callus being marked by a narrow line of pale purple. All the whorls well rounded, marked by fine, retractively curved, incremental lines, and fine, irregularly spaced spiral lirations, the latter becoming obsolete on the last turn. In addition to the above sculpture, the surface is slightly malleated beyond the nepionic whorls, mostly so on the antepenultimate turn. Suture moderately constricted. Periphery inflated, well rounded. Base strongly rounded, marked like the spire, the malleations, however, being faint and scattered. Aperture large, very oblique, decidedly effuse at the junction of the basal and outer lip; outer lip slightly expanded and reflected; columella slender, slightly curved, very oblique; parietal wall not covered by a callus.

The type (Cat. No. 218399, U.S.N.M.), and a paratype in Mr. Webb's collection, come from Makabenga. The type has 4.6 whorls and measures—altitude, 18.9 mm.; greater diameter, 23.8 mm.; lesser diameter, 19 mm. Mr. Webb's specimen has 4.5 whorls and measures—altitude, 19 mm.; greater diameter, 23.5 mm.; lesser diameter, 19.5 mm. This little species seems quite distinct from any of the forms known from the Philippine Islands.

COCHLOSTYLA SCHADENBERGI ILONGA 1, new subspecies.

Plate 19, figs. 1-3.

Shell broadly conic, with a strong peripheral keel. Nuclear whorls white, the succeeding turns pale horn colored, gradually deepening in tint as the shell increases in size. Placed upon this ground color we find a series of irregular shaped, retractively slanting axial white areas on the posterior half of the whorls, which are about as wide as the darker areas that separate them. These light areas send out slender spurs at the summit, which meet and make a narrow, wavy white line at the upper edge of the turns. The anterior termination of the light axial zones send out a slender spur on the rear side only, which almost connect with the neighboring light zones, giving this part of the shell the aspect of being marked by a slender white spiral thread. The anterior half of the dorsal surface is marked by four spiral threads, of which the second is double the width of the rest,

which are subequal, and a much broader interrupted spiral zone of irregular white blotches a little posterior to the periphery. The peripheral portion itself being blackish brown, the white and dark areas join their irregular patterns without losing their color intensity. The basal ground color agrees with that of the upper surface of the last whorl. The blackish-brown peripheral border of the upper surface is also present on the lower. This is succeeded by an irregular, broad white spiral area which is followed by four spiral white threads of which the second is about one-half as wide as the other three, which are equal. Another broad white area, equaling about one-third of the width of the base, encircles the columella. The expanded portion of the peristome is blackish-brown, tinged with reddish-brown at the inner edge. The light color also spots part of the white columella and in a little more intense form tinges the basal and parietal callus. The inside is pale bluish-white with satiny luster.

All the whorls are moderately rounded on the upper surface except at the black peripheral band, where they become slightly excurved. The basal portion of the last turn is well rounded and also lightly excurved at the peripheral keel. Aperture broadly oval, oblique, outer lip expanded and thickened; columella oblique, slightly concave, reflected over the base as a thick callus, which extends weakly over the parietal wall. On both surfaces the white spirals are impressed as if inlaid. The entire surface is marked by exceedingly fine, closely spaced striations, which cross each other at right angles and the lines of growth at an angle of forty-five degrees.

The type (Cat. No. 218402, U.S.N.M.) comes from Makabenga, Nueva Vizcaya, Luzon. It has 5.2 whorls and measures—altitude, 33.2 mm.; greater diameter, 51.2 mm.; lesser diameter, 43 mm.

This race differs from *Cochlostyla schadenbergi schadenbergi* in having the lip and peripheral keel blackish-brown, instead of pale brown. There are also decided differences in the light banding of the two forms. *Cochlostyla schadenbergi schadenbergi* comes from Quiangan, in the mountain range which lies to the west of the one from which our material was derived.

CHLOREA GMELINIANA Pfeiffer.

Plate 19, figs. 4-6.

Three specimens of this extremely rare and remarkable species were in the sending received from Mr. Webb. The general coloration of the shell is a pale green on the early whorls, deepening to dark green on the last turn. A rather broad white spiral band encircles the summit of the whorls and the base immediately below the peripheral carina. The basal portion of the peripheral keel is so

intensely dark green that it appears almost black. The surface of the shell is marked by decidedly retractorily slanting incremental lines, and fine incised spiral striations, and rather strong, quite regularly spaced wrinkles which are placed at right angles to the lines of growth and give the surface a decidedly malleated appearance.

The three specimens yield the following measurements: Number of whorls, 4.6, 4.6, 4.4; altitude, 14, 14.1, 13.3; greater diameter, 22.5, 23, 19.7; lesser diameter, 20.3, 19.8, 17.9. The first of the three is registered as Cat. No. 218405, U.S.N.M.; the other two are in Mr. Webb's collection. They were collected at Makabenga.

LEPTOPOMA MAUBANENSE MAKABENGANA, new subspecies.

Plate 20, figs. 4-6.

Shell broadly conic, thin, semitranslucent, bluish-white. Nepionic portion of the shell smooth. Postnuclear turns well rounded, marked by decidedly retractorily slanting incremental lines and numerous very fine, closely spaced, incised spiral striations, which are present both on the spire and the base. In addition to the above sculpture, four slender, obscure cords divide the space between the summit and the periphery into five subequal areas. The cords are marked at fairly regular intervals by elongate, brownish spots. Periphery of the last whorl marked by an acute compressed keel, which extends quite prominently to the edge of the outer lip. Suture but slightly impressed. Base very short, slightly concave immediately anterior to the peripheral keel, then moderately rounded, very narrowly umbilicated, without color markings. Aperture very oblique; outer and basal lips decidedly expanded and reflected; inner lip strongly curved, slightly reflected, almost covering the umbilicus; parietal wall covered by a thin callus.

The type (Cat. No. 218406, U.S.N.M.) and a paratype in Mr. Webb's collection come from Makabenga. The type has 6.2 whorls and measures—altitude, 18.8 mm.; greater diameter, 20 mm.; lesser diameter, 15.7 mm. The paratype has 6.4 whorls and measures—altitude, 19.4 mm.; greater diameter, 20.3 mm.; lesser diameter, 15.5 mm. The present subspecies differs from *Leptopoma maubanense* in being of much lighter texture, in having the peripheral keel much more pronounced and extending to the very edge of the lip, the base less rounded, and the umbilicus much narrower.

EXPLANATION OF PLATES.

PLATE 18.

- FIG. 1. *Cochlostyla luzonica makabengana*, top view, natural size.
2. *Cochlostyla luzonica makabengana*, profile view, natural size.
3. *Cochlostyla luzonica makabengana*, basal view, natural size.
4. *Cochlostyla lignaria aguinaldoi*, natural size.
5. *Cochlostyla carinata lunai*, natural size.
6. *Cochlostyla macrostoma vizcayana*, natural size.

PLATE 19.

- FIG. 1. *Cochlostyla schadenbergi ilongata*, top view, natural size.
 2. *Cochlostyla schadenbergi ilongata*, profile view, natural size.
 3. *Cochlostyla schadenbergi ilongata*, basal view, natural size.
 4. *Chloraca gmeliniana* Pfeiffer, top view, $\times 2$.
 5. *Chloraca gmeliniana* Pfeiffer, profile view, $\times 2$.
 6. *Chloraca gmeliniana* Pfeiffer, basal view $\times 2$.

PLATE 20.

- FIG. 1. *Cochlostyla domingoi*, top view, $\times 2$.
 2. *Cochlostyla domingoi*, profile view, $\times 2$.
 3. *Cochlostyla domingoi*, basal view, $\times 2$.
 4. *Leptopoma maubanense makabengana*, top view, $\times 2$.
 5. *Leptopoma maubanense makabengana*, profile view, $\times 2$.
 6. *Leptopoma maubanense makabengana*, basal view, $\times 2$.